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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,334	03/02/2005	Philip Anthony Ashworth	DYOUNP0285US	8952
23908 7590 11/19/2007 RENNER OTTO BOISSELLE & SKLAR, LLP 1621 EUCLID AVENUE NINETEENTH FLOOR CLEVELAND, OH 44115			EXAMINER RIGGS II, LARRY D	
			ART UNIT 1631	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/526,334

Applicant(s)

ASHWORTH ET AL.

Examiner

Larry D. Riggs II

Art Unit

1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-24 and 27-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-24 and 27-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 02 March 2005.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

Applicant's amendments filed 02 March 2005 are acknowledged and the amendments are entered.

### ***Status of Claims***

Claims 1-3, 6-24 and 27-43 are pending and examined on the merits.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-3, 6-23 and 32-43 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The instant claims are drawn to a computer system and method of a database having a plurality of records, wherein each record comprises a field point representation representing field extrema for a conformation of a chemical structure, each record having an index, wherein the index is a searchable string of the field point representation.

In the instant claims, there is no physical transformation by the claimed invention, thus the Examiner must determine if the instant claims produce a useful, tangible, and concrete final result.

In determining if the instant claims have a useful, tangible, and concrete final result, the Examiner must determine each standard individually. For a claim to be

"useful", the claim must produce a final result that is specific, substantial and credible. For a claim to be "tangible", the claim must set forth a practical application of the invention that produces a real-world final result. For a claim to be "concrete", the process must have a final result that can be substantially repeatable or the process must substantially produce the same result again. Furthermore, the claim must recite a useful, tangible, and concrete final result in the claim itself, and the claim must be limited only to statutory embodiments. Thus if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

Method claims 32-43 do not produce a tangible final result. A tangible requirement requires that the claim must set forth a practical application of the database to produce a real-world result. The instant claims are drawn to an apparatus and method of a searchable database wherein the records have representation in the form of a searchable index. However, the last step of the claims include an index in the form of a searchable string, the result of the invention is a set of data, such as an index, which, in itself, is not tangible. Since the claim itself must include a useful, concrete and tangible final result, the instant claims are non-statutory.

Regarding the system claims 1-3 and 6-23, because the method claims are drawn to nonstatutory subject matter for not producing a useful, concrete and tangible result, the systems that perform the process also do not produce a useful concrete and tangible result, thus also drawn to nonstatutory subject matter.

This rejection could be overcome by amendment of the claims to recite that a specific final result of the process is outputted to a user, or by including a result that is a

physical transformation. The applicants are cautioned against introduction of new matter in an amendment.

Claims 24 and 27-31 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 24 and 27-31 are directed to nonfunctional descriptive material.

Regarding claims 24 and 27-29, a database is merely a compilation of data, which is interpreted as nonfunctional descriptive material. See nonfunctional descriptive material under MPEP 2106.1.

Regarding claim 30, software, per se, without being on a computer readable medium, is considered as nonfunctional descriptive material, and thus nonstatutory. See nonfunctional descriptive material under MPEP 2106.1.

Claim 31 is drawn to a computer readable medium comprising computer software configured to provide the database of claim 24. The instant specification defines the scope of the limitation of "computer readable medium," with examples such as CDs, DVDs and/or floppy disks and then stored on a hard disk, and likewise as an electronic signal on a telecommunications medium, such as a radio frequency signal, an optical signal an electronic signal, a magnetic disk or tap, solid state memory, an optical disk, a magneto-optical disk, a compact disk and a digital versatile disk, (see specification, page 41, lines 7-17).

Thus, one skilled in the art would understand that computer readable medium includes carrier wave, which is a signal. For example, Fiekowsky et al., in US patent

6,090,555 (Date of Patent: July 18, 2000), define computer readable medium as being "a CD-ROM, floppy disk, tape, flash memory, system memory, hard drive, and a data signal embodied in a carrier wave." See column 14, claim 12. Bornstein et al., in US patent 6,1443,88 (Date of patent : Nov. 7, 2000) state, "The computer readable medium of the present invention generally includes a tape, a floppy disk, a CD ROM, a carrier wave. In a preferred embodiment, however, the computer readable medium of the present invention is a carrier wave." See column 8, lines 33-37.

Therefore, at least one embodiment of the instant claim 31 is drawn to carrier wave or a signal encoded thereon a computer program. A carrier medium is interpreted as a computer readable medium.

It was held by the court that claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such, are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material, e.g. a computer program, falls within any of the categories of patentable subject matter set forth in § 101. The following analysis on why such a signal encoded with functional descriptive material is nonstatutory subject matter is excerpted from the US PTO's "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (OG Notices: 22 November 2005, available from the US PTO website at <http://www.uspto.gov/web/offices/com/sol/og/2005/week47/og200547.htm>):

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*First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents §1.02 (1994). The three product classes have traditionally required physical structure or material.*

*"The term machine includes every mechanical device or combination of mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." Corning v. Burden, 56 U.S. (15 How.) 252, 267 (1854). A modern definition of machine would no doubt include electronic devices which perform functions. Indeed, devices such as flip-flops and computers are referred to in computer science as sequential machines. A claimed signal has no physical structure, does not itself perform any useful, concrete and tangible result and, thus, does not fit within the definition of a machine.*

*A "composition of matter" "covers all compositions of two or more substances and includes all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." Shell Development Co. v. Watson, 149 F. Supp. 279, 280, 113 USPQ 265, 266 (D.D.C. 1957), aff'd, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958). A claimed signal is not matter, but a form of energy, and therefore is not a composition of matter.*

*The Supreme Court has read the term "manufacture" in accordance with its dictionary definition to mean 'the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.' Diamond v. Chakrabarty, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which, in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See American Disappearing Bed Co. v. Arnaelsteen, 182 F. 324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which a claimed signal does not have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. Lorillard v. Pons, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in American Fruit Growers when it passed the 1952 Patent Act.*

*A manufacture is also defined as the residual class of product. 1 Chisum, § 1.02[3] (citing W. Robinson, The Law of Patents for Useful Inventions 270 (1890)). A product is a tangible physical article or object, some form of matter, which a signal is not. That the other two product classes, machine and composition of matter, require physical matter is evidence that a manufacture was also intended to require physical matter. A signal, a form of energy, does not fall within either of the two definitions of*

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manufacture. Thus, a signal does not fall within one of the four statutory classes of § 101.

*These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of § 101. Public comment is sought for further evaluation of this question.*

Thus, claim 31 is drawn to nonstatutory subject matter.

As nonfunctional descriptive material, claims 24 and 27-31 do not fall into any of the statutory subject matter class: process; machine; manufacture or composition of matter.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of



the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 6-15, 18-23, 32-38 and 41-43 rejected under 35 U.S.C. 103(a) as being unpatentable over Nicholls (US 7,110,888) in view of Millet et al. (US 4,817,036).

The instant claims are drawn to a computer system and method for searching a database with searchable index string, and a database having a plurality of records, wherein each record comprises a field point representation representing field extrema for a conformation of a chemical structure, each record having an index, wherein the index is a searchable string of the field point representation.

Regarding claim 1-3 and 32, Nicholls provides a method and system for determining a shape space for a set of molecules using minimal metric distances. Nicholls shows a computer system utilizing an ellipsoidal Gaussian representation (EGR) of a molecular structure comprising ellipsoidal Gaussian functions (EGF) such as electrostatic, steric fields of molecules and spatial parameters, (see column 8, line 61 – column 9, line 24), (the instant invention describes field point representation to represent electrostatic interaction fields, surface interaction (steric) field, and a scaffold field, specification page 12, lines 26-29). Nicholls shows multiple conformation of a chemical structure by shape and properties, (see column 13, lines 14-61) and a

structural representation of the chemical structure, (see column 19, lines 46- 52).

Nicholls shows multiple EGRs for a number of EGFs, (see column 23, lines 15-52).

Regarding claims 6-9, 18 and 19, Nicholls shows indexing of ellipsoidal Gaussian functions (EGF), wherein the identifiers ranging from a single symbol to multiple symbols are incremented and dependent on the characteristic EGF, wherein the symbols can represent the particular field, energy and distance, (see column 13, lines 14 – column 14, line 3).

Regarding claims 10-15 and 33-38, Nicholls shows measurement of physical properties of varying dimensions and range for each member of an EGF, (see column 8, line 29-60, Equation 13; column 13, line 14 – column 14, line 5; Figures 6 and 7).

Regarding claims 20-23 and 41-43, Nicholls shows a searching mechanism for searching a database of EGRs for molecular fragment similarity evaluation, wherein an EGR database is formed for a set of molecular structures with each EGF within each EGR generated to defining a set of atoms which belong to it (EGR defining various molecular fragments), wherein for a structure not represented in the database, generating a set of EGRs and their corresponding set of molecular fragments of the unrepresented structure, querying the database for similar fragments and if a search generates similarities above a certain specified level then reporting the matches, (see column 27, lines 1-31).

Nicholls does not show a searchable string indexing of an EGR, an indexing mechanism for generating an index of an EGR or deterministic functions to generate numbers in a range dependent on a numeric identifier.

Millet et al. provides a computer system and method for database indexing and information retrieval. Millet et al. shows string indexing of databases that are searchable, (see column 3, lines 43-49) and consist of numerical representation of data with binning increments of bit pairs that provide a numerical bit string for an individual record, (see column 8, line 1 – column 9, line 39).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the method and system for determining a shape space for a set of molecules using minimal metric distances of Nicholls with the database indexing and information retrieval by Millet et al. because by Millet et al. indexing allows more efficient storage and searching of databases.

Claims 16, 17, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nicholls and Miller et al. as applied to claims 1-3, 6-15, 18-23, 32-38 and 41-43 above, and further in view of Thomlinson et al. (US 5,778,069).

The instant claims are drawn to a computer system and method of a database having a plurality of records, wherein each record comprises a field point representation representing field extrema for a conformation of a chemical structure, each record having an index, wherein the index is a searchable string of the field point representation, wherein a deterministic function such as a pseudo-random number generator is used to generate numbers dependent on a numeric identifier.

Regarding claims 16 and 39, depending from dependent claims 8 and 32 respectively, wherein the indexing mechanism is configured to generate on or more

numbers in a range from 1 to n in dependence on the numeric identifier by using a deterministic function.

Regarding claims 17 and 40, depending from dependent claims 16 and 39 respectively, wherein the deterministic function is a pseudo-random number generator or a hash function.

Nicholls and Millet et al. are applied to claims 1-3, 6-15, 18-23, 32-38 and 41-43 above. However, Nicholls and Millet et al. do not show deterministic functions to generate numbers in a range dependent on a numeric identifier.

Thomlinson et al. provides a non-biased pseudo random number generator. Thomlinson et al. shows a hash computing device which computes an m-bit hash value of the input bit string assembled by the input device, using a hashing function to generate numbers from the hash (seed) value, (see column 3, lines 3-57; Figure 3); (a deterministic function takes a seed value and generates one or more output values in dependence on the seed value, see specification, page 20, lines 22-24).

It would have been further obvious to modify the system and process of Nicholls in view of Millet et al. as applied to claims 1-3, 6-15, 18-23 and 32-43 above, by using a hashing function to generate numbers from a seed number as shown by Thomlinson et al. to increase the precision of the database searching because Nicholls provides that organizing structures such that those with similar EGF descriptions to a test structure can be rapidly found is via an N-dimensional hash table, (see column 28, lines 22-26).

***Conclusion***

No claim allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Larry D. Riggs II whose telephone number is 571-270-3062. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LDR/  
Larry D. Riggs II  
Examiner, Art Unit 1631

/Shubo (Joe) Zhou/  
Shubo (Joe) Zhou, PH.D.  
Primary Examiner